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THESIS

IMPLEMENTING TOTAL QUALITY MANAGEMENT AT THE
INTERMEDIATE LEVEL OF AIRCRAFT MAINTENANCE

by

Rolando C. Salvanera

December, 1990

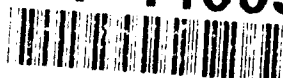Thesis Co-Advisors: Benjamin J. Roberts
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19 ABSTRACT (continue on reverse if necessary and identify by block number)

This thesis will show how Total Quality Management (TQM) can be taken from theory and operationalized at the intermediate level of aircraft maintenance. It begins by presenting four factors that will support the implementation process: top level commitment in the form of CNO support, the closed loop environment of intermediate maintenance activities, the successful implementation at the depot level, and the fact that components of TQM already exist within the Navy. The thesis then introduces some of the resource centers that can assist with the implementation process. The methods of TQM implementation as advocated by Navy resource centers (the Navy Personnel Research and Development Center and the Naval Aviation Maintenance Office) are explored. The thesis illustrates how the use of these resource centers, the early targeting of key personnel, and the use of a pilot program can help facilitate the implementation process. An examination of the obstacles to the TQM implementation process, such as adapting existing programs and reward systems, concludes the thesis.

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Implementing Total Quality Management at the Intermediate Level of
Aircraft Maintenance

by

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ABSTRACT

This thesis will show how Total Quality Management (TQM) can be taken from theory and operationalized at the intermediate level of aircraft maintenance. It begins by presenting four factors that will support the implementation process: top level commitment in the form of CNO support, the closed loop environment of the intermediate maintenance activities, the successful implementation at the depot level, and the fact that components of TQM already exist within the Navy. The thesis then introduces some of the TQM resource centers that can assist with the implementation process. The methods of TQM implementation as advocated by Navy resource centers (the Navy Personnel Research and Development Center and the Naval Aviation Maintenance Office) are explored. The thesis illustrates how the use of these resource centers, the early targeting of key personnel, and use of a pilot program can help facilitate the implementation process. An examination of the obstacles to the TQM implementation process, such as adapting existing programs and reward systems, concludes the thesis.

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I. INTRODUCTION

A. OBJECTIVE AND RESEARCH QUESTIONS

1. The Objective

This thesis will show how Total Quality Management (TQM) can be taken from theory and operationalized at the intermediate level of maintenance for naval aircraft. The objective is to show how the implementation of TQM can be achieved. This thesis will also serve as a source guide for other naval air maintenance activities wishing to implement Total Quality Management.

2. The Research Questions

The following questions will be researched in this thesis:

a. Primary Research Question

Can Total Quality Management be implemented at Intermediate Maintenance Activities?

b. Subsidiary Questions

Where are the Total Quality Management resource centers that Intermediate Maintenance Activities can turn to for help?

How do these resource centers approach the implementation process?

What can be done to help facilitate the implementation process?

What are some of the obstacles to the implementation process?

B. SCOPE, LIMITATIONS, AND ASSUMPTIONS

1. Scope

This thesis is about how Total Quality Management can be successfully implemented at Intermediate Maintenance Activities (IMA's). The potential benefits of implementing TQM are well known, therefore, this thesis will not explore whether Total Quality Management can or should be applied to Department of Defence activities. This thesis will not propose a specific implementation plan for an IMA, nor suggest a timeline at whose completion will yield a TQM organizational change.

2. Limitations

There are numerous strategies and models that may be used to foster an organizational change. Thus, the major limitation of this thesis is that it will present and examine only two strategies available to Intermediate Maintenance Activities for use. The two strategies examined were selected because they have been developed by Navy activities.

Although the thesis looks only at the Navy's Intermediate Maintenance Activities, these activities do not

operate in a vacuum. The lessons learned can be applied to the aircraft squadrons supported by the Intermediate Maintenance Activities, public works, base administration, and of course, the supply system.

3. Assumptions

This thesis is aimed towards Intermediate Maintenance Activities that are ready to implement Total Quality Management. It is therefore assumed that the reader is already familiar with the teachings of TQM, particularly Department of Defense's Total Quality Management Guide [Ref. 1]; along with the teachings of Deming, Juran, Drucker, and Shewhart whose philosophies have been embraced by the Department of Defense [Ref. 2]. The reader should also be versed in the roles and members of the Executive Steering Committee (ESC), Quality Management Boards (QMB), and Process Action Teams (PAT).

For the purpose of simplicity, the term Total Quality Management will be used throughout the thesis. Total Quality Leadership and Continuous Process Improvement are different titles for essentially the same management philosophy as Total Quality Management. In the same vein, it will be assumed that an Executive Steering Committee serves the same function as an Executive Steering Group; and that Project Action Teams are similar to Process Action Teams.

II. BACKGROUND

A. TOTAL QUALITY MANAGEMENT AND THE DEPARTMENT OF DEFENSE

Before 1988, the Department of Defense's treatment of
quality was a specification and an instruction. On 30 March
1988, Secretary of Defense Frank Carlucci formally directed
his department to adopt Total Quality Management. Quality
then became an integral part of the way Department of
Defense conducts business, and ultimately, a new way of
life. Total Quality Management was chosen because,

> Total quality management, with its operative concept of
> continuous process improvement, was selected as a proven
> management philosophy that was powerful enough and
> universal enough in scope to achieve the cultural change
> required for DoD to meet the unprecedented levels of
> quality required for future weapon systems and
> equipment. Total quality management seeks to marshal
> the creative energies and creativity of DoD and defense
> industry workers and to band them together in a drive
> for quality excellence. [Ref. 3]

Before Carlucci made Total Quality Management a Department
of Defense initiative, several pioneering commands initiated
their own TQM programs. The Naval Air Systems Command was
among those pioneers.

B. NAVAL AIR SYSTEMS COMMAND

The Naval Air Systems command, or more commonly referred
to as NAVAIR, is responsible for the Navy's inventory of

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aircraft and the organizations required to support those aircraft.

The maintenance procedures and the organizational structures required to support the aircraft are spelled out in the Naval Aviation Maintenance Program (NAMP). The NAMP's objective is

> to achieve and continually improve aviation material readiness and safety standards . . . with optimum use of manpower, material, and funds. [Ref. 4:p. 2-1]

The NAMP directs that maintenance support for the aircraft be divided into three levels: organizational, intermediate, and depot level. The organizational level is manned and equipped to handle removal and replacement of end item components of a weapon system. The intermediate level is geared towards the repair of the items removed at the organizational level. The depot level can refurbish and zero-time (make like new) the end items. The typical organizational unit is an aircraft squadron. The intermediate level organizations are known as Aircraft Intermediate Maintenance Departments (AIMD's) or Intermediate Maintenance Activities (IMA's). The depot level activities are called Naval Aviation Depots (NADEP's).

C. METHODOLOGY

1. Structure

This thesis begins by describing the Navy's current policy and attitude towards Total Quality Management. It then identifies the TQM resource centers available to the Navy's maintenance activities. The thesis continues by describing two methods of implementation as championed by some of the Navy's TQM advocates. It will conclude by suggesting ways to facilitate the implementation process and presenting areas that will require further study by the individual IMA.

2. Backdrop

Naval Air Station Lemoore is currently in the early stages of implementing Total Quality Management. They are receiving training in the form of a seminar taught by a team from the Naval Aviation Maintenance Office (NAMO). This thesis will use the work done at NAS Lemoore as a backdrop, citing specific examples when appropriate.

3. Literature Search and Review.

Of the many writings on TQM, the author felt that the following three books represented the minimum requirement for gaining a broad and solid understanding of the Total Quality Management process.

- *Out of the Crisis* by William Edwards Deming.
- *The Deming Management Method* by Mary Walton.

- *Juran on Leadership for Quality* by Joseph M. Juran.

Mary Walton's approach was especially useful because it dealt with some of the problems encountered by organizations when implementing Total Quality Management.

The Naval Postgraduate School's catalog produced a listing of previous master's thesis work done in the field of Total Quality Management.

The Defence Technical Center Information Center (DTIC) and Defense Logistics Studies Information Exchange (DLSIE) databases were queried using Total Quality Management as the keywords.

The *Readers's Guide to Periodical Literature* yielded up-to-date articles on work done on Total Quality Management by the civilian sector. In addition, copies of Lockheed, Hewlett-Packard, and Ameritech's (as taught by 3-M) quality manuals and resource guides were obtained.

4. Data Collection

Several trips were made to Naval Air Station Lemoore, CA. The first trip was made to determine the level of knowledge and general attitude towards TQM. The remaining trips co-incided with the seminars being conducted by the Naval Aviation Maintenance Office. Attendance at these seminars allowed first hand observations of the implementation process. Interviews with the Base Commander,

AIMD Officer, and NAMO's field team facilitators were also conducted.

A trip to San Diego was made to attend a three day TQM Implementor's Seminar taught by the Naval Research and Development Center (NPRDC); and to visit the Quality Center at Hewlett-Packard. The seminar by NPRDC provided insight into the implementation process from a strategic point of view, and a chance to interact with seventeen other TQM facilitator/co-ordinators from various other commands. The visit to Hewlett-Packard allowed the opportunity to see the results of implementing, and the challenges to TQM from an on-going perspective.

III. THE NAVY AND TOTAL QUALITY MANAGEMENT

Can the Navy implement Total Quality Management at the intermediate level of aircraft maintenance? The answer is a qualified, not a resounding yes. There are four major factors supporting this answer. The first factor is that the Navy's top leadership is actively supporting the drive towards Total Quality Management. The second factor is the essentially closed-loop producer-consumer relationship between Intermediate Maintenance Activities and the supply system. Total Quality Management has already been successfully implemented at the depot level of maintenance. Implementation at the intermediate level is the next logical progression, the third factor. The last factor in support of Total Quality Management is that many components of TQM already exist within the Navy.

In light of the fact that there are many favorable factors for implementing TQM within the Navy, it would be is overly optimistic to believe that a paradigm shift is all that is required.

All levels of management must realize that there are still numerous remaining hurdles to TQM. One of the issues that require attention is the ranking of individuals in the Officer's Report of Fitness and Enlisted Evaluations. The ranking of individuals runs contrary to Deming's philosophy.

Another hurdle is in the areas of procurement of weapon system. Still another is the need to eliminate the practice of universally applying Management by Objective to every management challenge, a practice that was taught and applied throughout the Navy. While these issues may be beyond what individual commands can change, top management must nonetheless still be aware of them.

A. TOP LEADERSHIP AND TOTAL QUALITY MANAGEMENT

To successfully manage change, all organizations must have the support of top management. The Navy has that support. Admiral Kelso, Chief of Naval Operations, issued a memorandum to all flag officers on the subject of Total Quality Leadership.

> Slick hype campaigns and catchy slogans are not what I have in mind. Nor do I want to impose another check list or inspection upon our people. Instead, I want us to structure a quietly effective effort to improve quality in the Navy which makes sense to our people... I've decided to call our approach for the Operating Forces "Total Quality Leadership" (TQL) because of the unique role that Navy leadership plays in developing and implementing our operational objectives. [Ref. 5]

Admiral Kelso goes on to explain the basics of Total Quality Leadership, emphasizing the need for continuous improvement.

> The most important aspect of the Navy's TQL program is support from the top. I am on board and ready to lead the team effort... I want to start now. [Ref. 5]

In addition to Admiral Kelso's declaration of commitment to
TQM, he encouraged all officers to become familiar with
Total Quality Management. He also included a "navalized"
version of Deming's Fourteen Points (Appendix).

B. **THE CLOSED ENVIRONMENT**

The environment that Intermediate Maintenance Activities
operate in lends itself to the teachings of Total Quality
Management. This is because the IMA's perform inside
definitive system boundaries with readily available measures
of effectiveness. A supporting supply organization is known
as the S-6 Division when aboard ship (afloat) or the
Aviation Supply Department (ASD) when part of a Naval Air
Station (ashore). When an organizational level maintenance
activity removes a defective end-item, that item is turned
into S-6/ASD for a replacement. The replacement part is
either issued from a spare parts pool or passed to the IMA
for expeditious repair. Either way, the broken part passes
from supply to the Intermediate Maintenance Activity for
repair. The IMA can either repair the part, pass it up to a
depot level activity, or dispose of it. If the part is
repaired, it is then returned back to S-6/ASD for subsequent
re-issue. If not repaired, the part is forwarded to the
depot level, again via S-6/ASD. On the most basic level,
parts are passed from supply to the IMA for repair, and

returned to supply for re-issue. The IMA and supply form a closed loop with each one's output, the other's input.

One of the tenets of Total Quality Management is continuous process improvement. However, before a process can be improved upon, it must be shown to be statistically under control. In order to demonstrate statistical control, the appropriate measurements must be taken. Defense readiness, the service output of an aircraft squadron, is relatively difficult to quantify. The IMA's output, on the other hand, is product oriented. Thus, the IMA and supply relationship lends itself to such measures of effectiveness. Repair turn-around times, awaiting parts time, awaiting maintenance time, cause of failure, and most-frequently-repaired-parts are just a few of the measurements already recorded by the existing Maintenance Data System.

C. TOTAL QUALITY MANAGEMENT AT THE DEPOT LEVEL

Total Quality Management has been successfully implemented at all of the Naval Aviation Depots. Implementation of TQM at the Intermediate Maintenance activities is the next logical step. The depot level facilities perform essentially the same function as the intermediate level, the maintenance of aircraft and their parts. The benefits of and lessons learned from TQM can be easily transferred from the depot level to the intermediate level.

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A major difference between the depots and IMA's is the staffing. The depot's workforce is mainly civilian contract workers with only a few military personnel. At the intermediate level, the staff is almost entirely military. As a consequence of the turnover of military personnel every three years, the propensity to reach and maintain the critical mass of personnel is a greater challenge for the IMA's than the depots.

D. EXISTING COMPONENTS OF TOTAL QUALITY MANAGEMENT

Since TQM seeks to utilize the "best of the best" in management techniques, it is not surprising to find that several of these techniques are already practiced within the Navy. One such program is the Military Cash Awards Program (MILCAP). Some of the objectives of MILCAP are to:

- Encourage military personnel to suggest practical ways to reduce costs and improve productivity in the Navy, DOD and other Federal government operations.

- Provide [a] formal channel for communications between management and personnel.

- Maintain working conditions where imagination, creativity, and innovation are encouraged. [Ref. 6]

The parallels between these objectives and those of TQM are readily apparent.

The Model Installation Extension Program (MIEP) is another program which mirrors the teachings of TQM. Under the MIEP, requests for waivers:

- Can be used to request relief from any policy, regulation or law which stands in the way of implementing an innovative idea.

- Installation commanders should use waivers to obtain freedom in purchasing goods and services wherever they can get the combination of quality, responsiveness, and cost that best satisfies their requirements. If appropriate, constraining laws or federal regulations may also be the subject of waiver requests. [Ref. 7]

Still another aspect of TQM that already exists within IMAs is the emphasis on statistical processes. The NAMP states that the objective of the Trend Analysis Program is

[T]o enable maintenance managers to determine the frequency and types of discrepancies being generated so proper corrective action can be implemented in a timely fashion. [Ref. 8:p. 7-44]

The Trend Analysis Program is supported by the Data Analyst. The Data Analyst is a senior petty officer or non-commissioned officer with formal training in statistical analysis (Navy Enlisted Classification code 6313). The Data Analyst's primary duties include assisting with the collection, maintenance, and distribution of data in a narrative form, charts, or graphs. [Ref. 8:p. 7-8]

IV. THE TOTAL QUALITY MANAGEMENT RESOURCE CENTERS

There are four Total Quality Management resource centers that the Intermediate Maintenance Activities can turn to for assistance. They are the Chief of Naval Education and Training Command (CNET), the Naval Personnel Research and Development Center (NPRDC), the Naval Aviation Maintenance Office (NAMO), and various other Department of Defense commands that have already established a TQM center. Also included within the last group are non-DoD organizations, along with various contractors and seminar management agencies.

A. CHIEF OF NAVAL EDUCATION AND TRAINING

In response to the Secretary of Defense Carlucci's memo, a Department of the Navy TQM Executive Steering Group (ESG) was established in December, 1988. The ESG's membership includes all Assistant Secretaries of the Navy, the Vice Chief of Naval Operations, the Assistant Commandant of the Marine Corps, the Deputy Chief of Naval Operations, and selected second echelon commanders. This ESG is chaired by the Under Secretary of the Navy. One of the first actions by the ESG was to establish a Quality Management Board for TQM Education and Training. The purpose of this QMB was to develop the strategic plan for TQM education and training

throughout the Navy. The Executive Steering Group approved the QMB's strategic plan in August, 1989 [Ref. 9]. The strategic plan has two main goals:

- Institutionalize TQM Education and Training within the DON.

- Educate all DON personnel in TQM perspectives and train personnel in concepts and techniques for TQM implementation. [Ref. 9]

The Education and Training QMB established several milestones pursuant to these goals. One of these milestones was the development and publication of a generic TQM Awareness Course for use by the fleet. The result was a Department of the Navy TQM Awareness Course which consisted of a student handbook (stock number 0537-LP-000-0200) and overhead slides (0537-LP-000-0100). The awareness course was developed under contract for the Office of Civilian Personnel by Booz-Allen & Hamilton Inc. [Ref. 10]. The awareness course is currently going through its sixth revision, which will include inputs from the fleet and the Navy Personnel Research and Development Center [Ref. 11].

Another milestone established by the Education and Training QMB was to direct and fund the Naval Personnel Research and Development Center as a central repository for the Navy's TQM education and training materials and expertise. The Naval Personnel Research and Development Center has since been designated a permanent site.

B. NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER

The Quality Support Center within the Organizational Systems Department, Naval Personnel Research and Development Center, is currently spearheading the Navy's TQM efforts. NPRDC has been heavily involved with the Navy's TQM endeavors since the early 1980's. In 1983, NPRDC was asked to conduct a TQM application feasibility study by the Chief of Naval Material (now Naval Supply Systems Command). Following a positive recommendation, NPRDC assisted with the development of a pilot program at Naval Aviation Depot, North Island, CA. By 1985, the lessons learned at North Island had been applied to the remaining Aviation Depots.

NPRDC was then tasked by the Department of the Navy's Executive Steering Group via the Education and Training QMB to develop the TQM Implementor's seminar. The seminar has been held at San Diego since 1988. The Implementor's Course will be discussed in detail later in the thesis.

Following the successful development of the TQM Implementor's seminar, NPRDC has since been tasked to develop a Senior Manager's TQM Awareness Course. The Senior Manager's course is aimed at Flag rank officers, their civilian equivalents, and base and unit commanders. The first course is scheduled to be taught at the Naval Postgraduate School, Monterey, CA in early CY 1991.

NPRDC has also published several studies about TQM and the Navy. Some of the titles include:

- *Total Quality Management Source Guide.*

- *Total Quality Management Case Study in a Navy Headquarters Organization.*

- *Managing for Organizational Quality-Theory and Implementation: An Annotated Bibliography.*

- *An Introduction to Quality Management: Selected Readings.*

C. NAVAL AVIATION MAINTENANCE OFFICE

The Naval Aviation Maintenance Office in Patuxent River, MD is designated by the NAMP [Ref. 4:p. 2-3] and NAVAIR [Ref. 12] to serve as the focal point for fleet aviation maintenance performance improvement matters. NAMO's involvement with TQM therefore came as a natural outgrowth of the Productivity Improvement Program (PIP). The PIP was initiated in the early 1980's as part of the productivity/ performance programs to help offset the effects of decreased funding, particularly in the area of depot-level repairables. NAMO's early work in the PIP program was later expanded beyond productivity, to include quality, effectiveness, quality of life, and budgetability. With the addition of TQM and the intermediate level of maintenance to the Productivity Improvement Program, NAMO has taken to calling the endproduct of that expansion Continuous Process Improvement (CPI).

To fill its role as the focal point for TQM within fleet aviation maintenance activities, NAMO has as part of its

Maintenance Management and Performance Improvement Department the Total Quality Management Training and Assistance Center (NAMO-00Q). NAMO provides CPI/TQM assistance and training to fleet activities in a structured five day workshop.

The activities they have assisted include the IM/S-6 Department aboard USS Nimitz, (CVN-68); Second Marine Aviation Wing (2nd MAW), Cherry Point, North Carolina; Marine Aviation Logistics Squadron Two Nine (MALS-29), New River, North Carolina; Marine Aviation Logistics Squadron Three One (MALS-31), Beaufort, South Carolina, and NAS Lemoore, CA.

The Naval Aviation Maintenance Office has become the de facto TQM resource center for NAVAIR, much in the same manner that NPRDC has become the resource center for the entire Navy.

NAMO supported in the development of the TQM awareness module that is being taught at the Aviation Maintenance Officer School at Pensacola, FL. NAMO also developed the core course material for the TQM module that is taught at the Joint Aviaton and Supply Maintenance Material Management course at the Supply Corps School, Athens, GA.

D. OTHER SOURCES

IMA's can also turn to other DoD organizations for assistance in implementing TQM. NPRDC maintains a source

guide with points of contacts of DoD activities that are willing to assist other activities. Among these are Naval Supply Center, San Diego; McClellan Air Force Base in Sacramento; along with the Sacramento Army Depot. The Air Force's TQM program is called Quality: People, Processes, Performance, and Product (QP-4).

Several of AIMD Lemoore's Division Officers and Chief Petty Officers received TQM training at McClellan AFB. McClellan AFB has also provided TQM facilitator and Process Action Team Leader training to several Leading Petty Officers from NAS Lemoore.

There are also a myriad of private sector organizations that hold or sponsor seminars on TQM. Quality Enhancement Seminars holds a series of seminars with Dr. Deming as the principal speaker. The Navy's generic TQM Awareness course was developed by a private contractor, Booz-Allen & Hamilton Inc. Again, NPRDC maintains a listing of such seminars and contractors.

Another excellent source for additional TQM material is the American Society of Quality Control (ASQC). The ASQC regularly sponsors lectures and forums on the subject of quality around the nation.

V. NPRDC'S PROCESS IMPROVEMENT MODEL

The Navy Personnel Research and Development Center holds a two and a half day Implementation Seminar in San Diego several times a year. The seminar is presented by NPRDC's Quality Support Center. The purpose of the seminar is to present executives and TQM co-ordinators with advise on how to develop an implementation strategy and lead a TQM transformation at their activities. NPRDC's advice on developing an implementation strategy covers what steps must or should be performed. The actual determination of how to perform these steps is left up to the individual command.

The seminar has four phases: a review of basic TQM concepts, planned organizational change, an implementation approach, and integrating the management structure with continuous improvement.

A. BASIC CONCEPTS

The seminar begins with a review of the basic TQM concepts and philosophies. Also covered in the review is a brief history of the Navy's involvement with TQM, along with current Naval policy and definition. Total Quality Management is defined at the seminar as:

TQM is the application of quantitative methods and people to assess and improve:

- Materials and services supplied to the organization.

- All significant processes within the organization.

- Meeting the needs of the customer, now and in the future. [Ref. 13]

The review of TQM concepts is purposely brief, NPRDC's prerequisite for attending the seminar is that attendees have had at least forty hours exposure to the basic TQM concepts.

B. PLANNED ORGANIZATIONAL CHANGE

Introducing the Total Quality Management as a planned organizational change is the next phase in the seminar. NPRDC uses a model presented by Edmund J. Metz [Ref. 14]. Several areas of Metz's model are highlighted in the seminar, in particular are the management tools and functions that he feels needs to be done better. Metz identifies four areas that need improvement: new philosophy, definition of goals and values, the transition steering committee, and the strategic change plan. These areas take on an added dimension when set against traditional Navy management practices.

The message of this part of the seminar is that to successfully implement TQM within the Navy, a new philosophy must be adopted. The problem, however, is that management practices within the Navy has been an integral part of a

bureaucracy that has been building momentum for over two hundred years. Any change will meet with strong resistance.

The definition of the organization's goals and values must be determined and stated. This definition of goals is called vision. An organizational vision statement must also state how the goals will be accomplished. In order for the vision statement to be useful, it must be meaningful to all members of the organization, not just top-management personnel with post-graduate educations.

Since change is long in coming (Deming states at least five years [Ref. 15]), the importance of a transitional steering committee can not be over-stated. The goal of the steering committee is to determine which of the many routes the organization is willing to take to reach its vision. The steering committee must therefore be closely monitoring the vision statement and the organizations environment. If either the vision or the environment has changed, the current actions being taken to support change can be rendered ineffective and detrimental. The steering committee must be ready to initiate corrective action as early as possible. For example, a new program (soliciting ideas from workers) is started and allowed to progress under the guise of organizational change, but is rendered obsolete by a change in goals or regulations (management not willing or able to enact the suggestions due to budget constraints). Because the program was allowed to proceed, the time and

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effort of middle and lower level management has been wasted. They experience frustration, leaving them more resistant to the next round of change efforts.

The strategic change plan integrates the new philosophy, vision, and the steering committee. The organizational change must be incorporated into the activities' strategic planning. The need for a strategic level plan stems from the fact that organizational changes signal a departure from the present way of doing things, otherwise a change would not have been contemplated.

C. AN IMPLEMENTATION APPROACH

This phase of the seminar starts with the traditional management organizational pyramid. It then proceeds to superimpose the ESC, QMBs, and PATs. Who serves on these boards and what functions the boards serve is also reviewed. The concepts of who are the product managers, process owners and process workers is introduced simultaneously with the boards. A fundamental feature in NPRDC's model is the concept of "linking pins." NPRDC advocates that one member of a QMB is also a member of the ESC above it, likewise, one member of the QMB also be present on the PAT below it. These link pins ensure positive communication and representation within the TQM structure. This section is capped by an exercise in which members are asked to identify an organization, a primary customer, an strategically

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important process, the process' owners, potential QMB and PAT members. The key benefit of this exercise is an understanding of how important it is to identify the process owners and stakeholders so that a process can be effectively changed. The corollary to this is that an organization should not attempt to change a process they have no control over.

An in-depth discussion on the development of a quality philosophy follows the process owner exercise. The discussion begins with the role the philosophy statement plays in the organizational change. What makes up a good philosophy statement is addressed. A philosophy statement should:

- Give guidance as to what the organization is going to do.
- Convey a sense of purpose.
- Provide an underlying theme.
- Provide a Long-term view or commitment.
- Be customer-oriented. [Ref. 13]

NPRDC concludes the philosophy statement discussion with a critique of philosophy statements taken from private firms and other commands.

The next areas covered in the seminar are TQM education and training issues. The issues include the make or buy decision for training the activities personnel. NPRDC

places additional emphasis on developing an in-house

capability. The emphasis is in part due to the fact that

private sector seminars are expensive and that DON Education

and Training QMB memo states,

> It is incumbent on each command or activity to fund its
> education and training requirements, adapt this guidance
> (DON Education and Training Strategic Plan) to its own
> organizational requirements and develop an educational
> and training capability in TQM that satisfies these
> minimal guidelines. [Ref. 9]

It is also in the activities best interests to develop their

own in-house training capability to ensure conformity in

training, and to maintain a critical mass. The last

training issue examined is on when and how much training a

worker should receive.

A short section of the seminar is devoted to an internal

organizational assessment. The assessment is used as a

planning tool to gauge the activities readiness to change,

to establish a baseline, and to generally identify the

organization's culture.

The last areas covered are guidelines and a plan for TQM

implementation. NPRDC offers a very comprehensive list of

individual actions or milestones that must be accomplished

in the implementation process. An exercise in planning

these milestones summarizes this part of the seminar. In

the exercise, seminar participants are asked to develop

their own Gantt-style implementation plan. Each group

presents in their plan, which in turn is critiqued by NPRDC's staff members and other seminar members.

D. INTEGRATING THE MANAGEMENT STRUCTURE WITH CONTINUOUS IMPROVEMENT

The Process Improvement Model (PIM) is the subject of the final phase in the NPRDC seminar. The PIM is based on Shewhart's Plan-Do-Check-Act Cycle (PDCA) [Ref. 16]. NPRDC begins by integrating the TQM structure with the PDCA cycle. Each phase in the PDCA cycle, and which board it correlates to is discussed. For example, the Plan phase is the responsibility of the ESC and QMB. These boards are involved in identifying and defining strategic processes, prioritizing the goals, providing a scope and limitation for the improvement efforts. A brief overview of statistical process control (SPC) concludes this phase and the seminar.

VI. NAMO'S CONTINUOUS PROCESS IMPROVEMENT WORKSHOP

The Naval Aviation Maintenance Office seeks to provide organizations with:

- The basis for a corporate culture within an organization that will promote TQM principles.

- TQM awareness training.

- Training in the use of graphical problem solving tools and techniques.

- The application of those tools to continually improve customer support. [Ref. 17]

NAMO provides a structured approach in five phases, planning, education, assessment, process improvement, and process evaluation phases. A 5-day workshop is the centerpiece of NAMO's approach. The five phases can be grouped into three, chronologically distinct stages, a pre-workshop, the actual workshop, and a post-workshop.

A. PRE-WORKSHOP STAGE

The pre-workshop stage consists entirely of the planning phase. Approximately 30-60 days before the workshop, a NAMO field team will visit the organization. The purpose of the visit is to lay the groundwork for the upcoming workshop.

The pre-planning phase has four goals: a TQM Overview, CPI Structure Overview, CPI Training Overview, and development of the agenda.

1. TQM Overview

Top management is presented with the Total Quality Management philosophy, using the DoD TQM Master Plan as the main point of reference. Special emphasis is placed on management's role in improving systems and process ownership, customer focus, team building, and participative management.

2. CPI Structure Overview

The role and composition of the Executive Steering Committee, Quality Management Boards, and Process Action Teams are discussed. The pros and cons of membership to, and how many boards to have, are discussed. The NAMO field team helps top management decide what type of structure they will adopt. The field team also presents some of the structures that have been adapted by other organizations they have visited.

3. CPI Training Overview

Shewhart's Plan-Do-Check-Act Cycle is used to introduce the Continuous Process Improvement model advocated by NAMO to top management. Management is also briefed on the remaining phases, (education, assessment, improvement,

and evaluation phases) and how they will be handled during the workshop.

4. Develop Agenda

Top management and the organization's TQM co-ordinator are tasked with determining logistical and administrative responsibilities for the seminar. More importantly, top management's role during the workshop is established. Before the NAMO field team leaves, everyone should be familiar with what portion of the workshop they will be teaching or leading a discussion on.

B. WORKSHOP STAGE

The actual five day workshop consists of the education phase, followed by the assessment and process improvement phases.

1. Education Phase

The first two days of the workshop consists of the education phase. During this phase, middle level management is made aware of top management's plan and commitment to change the organization to support TQM. Day one is similar to the planning phase in that a TQM overview, CPI training, and CPI structure overviews are given to middle management. The major difference between now and the planning phase is that top management are the ones briefing their middle managers, not the NAMO field team. The focus is on defining what middle managements future responsibilities will be, and

again a demonstration of top management's support. At NAS Lemoore, the briefings were handled by CAPT Hart, Commanding Officer, NAS Lemoore; CDR Clawiter, AIMD Officer; and CDR Morris, Supply Officer. The briefings were given to the Division Officers, Chief Petty Officers, and Leading Petty Officers.

The remainder of day one is spent developing the organization's mission statement. The mission statement is developed by top management, with the inputs from middle management, with particular attention on customer support.

Day two of the education phase is devoted entirely to presenting what NAMO calls the graphical tools of TQM. The day is divided up into approximately one hour sessions. The subjects covered are: Introduction to Variation, Flow Charts, Histograms, Run Charts, Control Charts, Pareto Charts, Cause and Effect Diagrams, and Scatter Diagrams.

2. Assessment Phase

The third day of the workshop is the assessment phase. NAMO conducts an internal and external assessment of the IMA/Supply organization. The assessments are conducted utilizing a Nominal Group Technique (NGT). Under NGT individuals rank what they perceive are the problems. They are then brought together, and as a group decide what problems actually exist, define and prioritize the problems. The internal assessment starts on day three. The external

assessment is also using NGT, with the organization's customers forming the group. At NAS Lemoore, representatives from the organizational squadrons, public works, base operations, and the COMLATWINGPAC were invited. Since the external assessment is conducted without any of IMA/supply members present, anonymity is assured. The external assessment is led by one of NAMO's field team representatives, independent of the workshop site.

3. Process Improvement Phase

The Process Improvement Phase begins with the clarification and consolidation of the internal and external assessment results. To combine the results, NGT is used once again. By day four of the workshop, several of the problems identified in the assessment phase are ready to be tackled. All participants in the workshop help to identify the process under investigation and determine the corresponding measure of effectiveness. The initial PATs are formed, and are given the remainder of the day to work.

On day five, the PATs report out their initial findings to the QMBs and ESC.

C. POST-WORKSHOP STAGE

The Post Workshop Stage or Process Evaluation Phase takes place approximately 30 to 60 days after the workshop is completed. The NAMO field team corresponds with the activity in an effort to determine whether the process

improvements have taken effect. The focus is on the measures of effectiveness, and if they show a change. If the measures do not show change, the original planning is re-evaluated and the process started once again.

The Process Evaluation Phase does not currently entail a follow-up, on-site visit by the NAMO field team. The field team mainly serves in a consulting-type role. The field team will, by special arrangement, make a follow-up visit.

VII. FACILITATING THE IMPLEMENTATION PROCESS

Every successful change comes from within the organization. Assistance from the TQM resource centers will not of itself guarantee a successful implementation process. However, there are several areas in which an organization can help to facilitate the process. These areas include maximum use of the resource centers, targeting key personnel early, and use of a pilot program.

A. UTILIZE THE RESOURCE CENTERS

IMAs wishing to implement Total Quality Management in their organizations should utilize the resource centers to the fullest extent possible. There is no reason for each organization to "re-invent the wheel."

Intermediate Maintenance Activities should consider both NPRDC's seminar and NAMO's workshop essential components in the implementation process. These resource centers present the implementation process from different but complimentary perspectives.

NPRDC presents what steps must be accomplished to successfully implement TQM. The steps are from a strategic point of view. Since the seminar is strongly grounded in management theory and strategic in focus, only Executive Steering Committee members and the TQM Coordinator should

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receive this type of training early in the implementation. NAMO's workshop, on the other hand, uses a "nuts and bolts" approach. The workshop provides a complete demonstration of the TQM philosophy using a one of t'e organization's own strategic processes. Since NAMO traces the TQM process through its complete cycle, the training is geared mainly for the QMB and PAT level. All levels of management can and should attend this seminar.

1. Utilizing NPRDC

Before starting any TQM effort in earnest, IMAs should send their TQM coordinator and at least one member of the ESC to attend the NPRDC Implementor's Seminar. By attending the seminar, these individuals can ensure that strategic considerations will be addressed when finalizing the command's long range implementation plan. For instance, an individual who attended the seminar should brief the remaining members of the ESC on the issues brought up discussed. They should encourage the use of NPRDC's Gantt style Implementation Planning exercise in for their own activity. By completing the planning exercise, each ESC member will realize that change will not come quickly. The exercise will also help the ESC keep the long term goals in perspective, and aid in planning travel and funding requirements.

The Navy Personnel Research and Development Center's exercise in identifying a strategic process and its owners is another tool that should be utilized by the TQM structure. It should not be just for training purposes. The conducting the exercise and reviewing its corresponding background material will improve the effectiveness of any newly formed QMB.

In addition to NPRDC's seminar, the previously mentioned NPRDC reports would make useful additions to any activity's own resource center. These reports are practical, not merely academic exercises. One such report that maintenance managers may easily relate to is *A Total Quality Management Process Improvement Model* [Ref. 16]. This report includes a *Fictitious Case Study of the F/A-32 Wolverine Airframe Repainting Process*.

Another NPRDC product that IMAs should consider is the upcoming Senior Manager's TQM Awareness course to be taught at Monterey, CA.

2. Utilizing NAMO's Workshop

Intermediate Maintenance Activities should make every effort to have the Naval Aviation Maintenance Office hold an on-site workshop at their commands. NAMO is uniquely suited to teach TQM to aviation maintenance activities. Because of NAMO's tasking to support the NAMP, their inherent familiarity with maintenance procedures and

policies greatly reduces the communication barrier between them and the activity. Outside consultants would have to devote resources into understanding how IMA's operate and inter-relate with the supply system and operational squadrons. NAMO's field teams inc 'ude senior enlisted personnel who have worked at the various levels of maintenance. Being able to understand the terminology and the processes involved is a marked advantage in the implementation process. This is particularly important during the internal and external customer assessment phases of the workshop.

Being able to "speak the language" of maintenance activities is not the only reason for hosting a NAMO workshop. The Naval Aviation Maintenance Office has held the workshop at an increasing number of sites. Thus the workshop and its contents have been tempered by its exposure to operational units. This "reality check" has shifted the emphasis away from the theoretical and into the practical, how-to, material that meets the field user's requirements.

The Naval Aviation Maintenance Office is effectively creating a network of intermediate maintenance activities that have implemented TQM. This network can be contacted for help, lessons learned, and how they handled certain problems. Communication among NAMO alumni is aided because they use the same structured approach.

Intermediate Maintenance Activities are encouraged
to use the NAMO workshop as a model for developing their own
in-house training program, as the IMA aboard the USS Nimitz
has done.

The Naval Aviation Maintenance Office is currently
internally funded for the on-site visits. The host activity
is not responsible for setting up a fund cite to pay for the
field team's lodging, travel, or per diem. The only
Operations and Maintenance, Navy (O&M,N) activity budget
requirements to support the workshop is for the reproduction
of the workbook, and ancillary office supplies (chart paper,
overhead transparencies, etc). Resourcing for follow-on
visits is unresolved at this time.

B. TARGET KEY PERSONNEL EARLY

Intermediate Maintenance Activities should target and
train key personnel early in the implement. Although the
existing chain of command makes the Officers and Chief Petty
Officers logical selections for Executive Steering Committee
and Quality Management Boards, there are still other
positions that need to be filled. These positions are the
TQM Coordinator and the Data Analyst.

One of the reasons for targeting them early is the lead
time involved with obtaining TQM training. Regardless of
which of the TQM resource centers the IMA turns to, lead
times of at least one month are common when obtaining the

limited billets at seminars. TQM seminar registration fees and travel monies are often unfunded requirements and will have to compete for unit's unappropriated funds.

Another reason for training key personnel early is if the IMA anticipates an on-site training from NAMO or other outside consultants. In this situation, the ESC and others can focus on how to adapt and apply the TQM philosophy to their own situations, rather than on learning what the TQM philosophy entails.

1. The TQM Coordinator

The TQM Coordinator will serve as a change agent within the organization. Larry Johnston researched this aspect of TQM implementation. He concluded from a survey of 143 civilian and federal TQM-type organizations that a change agent possess certain characteristics. The top seven traits are:

- Integrity and perseverance.
- Credible knowledge of the organization's processes and products.
- Effective interpersonal skills.
- Well developed communication skills.
- Motivation and initiative.
- Innovative ability and imagination.
- Knowledge of quality management theory. [Ref. 18]

Johnston conducted additional research in the associated areas of Selecting the TQM coordinator, fitting the coordinator into the existing structure, use of outside consultants, and staffing the TQM center.

2. The Data Analyst

The Data Analyst is a key position within the TQM structure because he/she serves as the primary link between the Intermediate Maintenance Activity and its principal measurement system, the Maintenance Data System.

Training the activity's Data Analyst in Total Quality Management early can help make the most of NAMO's workshop, possibly even teaching some of the statistical tools. For example, the Data Analyst can collect real data from the station's historical file for use during the education phase of the workshop. Regardless of who actually teaches in the workshop, run and control charts are much more interesting when using actual maintenance data. Likewise, histograms and pareto charts take on more meaning when using recent awaiting maintenance times.

The Data Analyst should also be on hand when the workshop reaches the process improvement phase and is ready to apply what they have recently learned. He/she could help determine if the data exists and/or available for use by the Process Action Team.

C. PILOT PROGRAM

A third area that can help facilitate the implementation process is the use of a pilot program. Intermediate Maintenance Activities should embark on a pilot program rather than trying to apply TQM in a universal manner. The purpose of a pilot program is:

> [T]o see if a significant difference could be made in the climate, operating effectiveness, and productivity of a small segment of the organization through planned "intervention," as a basis for considering larger efforts. [Ref. 19]

The actual selection of which processes the IMA is ready to apply TQM to is of critical importance. The most important factor is that the problem with the process be solvable. Another consideration is that the process be meaningful to the organization or its customers.

Having a successful pilot program can bolster the activity's confidence in TQM as a viable program. As in the case with any change, there are three groups of people. Those that welcome the change, those that oppose it, and those that are indifferent. An early success can help sway the "fence-sitters," and start working on the more obstinate members.

Utilizing a pilot program approach will require training a functional QMB and subordinate PATs. This early TQM structure can then be used to critique whether the planned structure meets the actual needs of the organization in

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terms of guidance and latitude provided, channels of communication, feasibility of the Vision/Mission statement, etc.

Besides providing feedback regarding the TQM structure's organizational effectiveness, it can also help identify future training requirements. Did the teams need additional training in particular areas? These inputs will provide valuable guidance when developing an in-house training capability.

A word of caution, however, when using a pilot program. The Executive Steering Committee should acknowledge the potential problem with training a PAT early. The TQM philosophy should be implemented top-down. Training workers before the managers will create fear and resentment. The ESC can avoid this potential problem by ensuring that all managers affected by the pilot program receive TQM awareness training before chartering the PATs.

VIII. OBSTACLES TO THE IMPLEMENTATION PROCESS

There are several obstacles to completing an organizational change. One of the obstacles to completing that change is the remnants of the old system. These remnants must be adapted to operate in the new environment or done away with completely. Intermediate Maintenance Activities must decide how to handle these potential problem areas. IMAs should also look at is how to support its TQM efforts.

A. ADAPTING EXISTING PROGRAMS

As mentioned earlier in the thesis, there are several programs already within the Navy that support the TQM philosophy. In addition to the Military Cash Awards Program and the Model Installation Extension Program, there is the Buy Our Spares Smart (BOSS), Beneficial Suggestion (Benesug), Self-Help and DoD Hotline programs. The Executive Steering committee must decide how these programs are to mesh with their envisioned TQM philosophy. Perhaps the easiest choice is to integrate the programs and their administrators in their entirety. The ESC has to balance the ease of transplanting these programs with terminating them and starting over. How effective these programs have been in the past is a major consideration. The option of

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starting over warrants careful consideration if these
programs have to overcome a stigma of not being very
effective in the past.

B. REWARD SYSTEM

Top level management must decide how the organization's
reward system will fit into and support the Total Quality
Management philosophy. Reward systems are needed because
they will provide positive feedback to the organization when
it moves in the strategically desired direction.

> There are, however, other design variables in addition
> to structure to be considered if a firm is to marshal
> its resources effectively and implement its strategy.
> Congruent reward systems must provide the incentives
> necessary for people to work effectively and in harmony
> with the organization's goals. [Ref. 20]

The challenge faced by the Executive Steering Committee
is that as with any reward system, you get what you reward.
In the Navy's case, current rewards, monetary, personal
awards (medals) or otherwise rewards individualism.
Individualism, however, runs contrary to the TQM philosophy
of team building.

Within an ideal TQM setting, the environment is such
that suggestions for improvements are volunteered for
increasing the quality of an organization, not for
individual gain. The Executive Steering Committee is
responsible for pacing the transition of the reward system

with the growth of the critical mass within an organization.

The ESC must take care not to stifle the inflow of ideas. In the Navy, as ideas are submitted to the QMB, the QMB is empowered to assign personnel to the Process Action Team. This leads to a possible loss of "ownership" of a suggestion. The worker that formulates an idea, and is not able to work on its incorporation, is denied an intrinsic award. The individual should receive some kind of surrogate award (e.g. recognition at the completion of the project).

Successful Process Action Teams should be rewarded for solving the problem in an innovative manner or other exceptional accomplishments. The ESC and QMB has to also recognize that while the PAT members were meeting and working, still other non-PAT members had to manage with the daily workload. (This would not be the case if the PAT members were volunteers working during off-hours.) Because the Navy assigns members to their PATs, the ESC must be careful not to give the appearance of rewarding personnel for "just doing their jobs."

C. SUPPORTING THE TOTAL QUALITY MANAGEMENT PHILOSOPHY

An activity must always be looking at the long term. The ESC can not get immersed in the challenges of constructing a TQM structure and providing the training to make it work. With the relatively rapid turnover of military personnel, the TQM structure needs to have built-in

support mechanisms. Two such mechanisms are that the TQM structure include methods for maintaining self guidance, and recording and adding to the corporate knowledge.

1. Keeping on the TQM Trail

A few short years into the implementation process approximately half of the personnel will have transferred out. The burden on the new personnel is evaluating what has been accomplished. Assuming that the vision did not change, the new ESC and QMBs have to determine if they are still on the right path to quality. If the vision did change, does the TQM structure include a means of telling them so?

The solution at Hewlett-Packard was to put in place an evaluation system. The evaluation is a joint effort between the TQM Center and the division being evaluated. Using the same criteria, two independent results are derived and then reconciled. Feedback from the evaluation includes what the organization perceives the mission statement to be and if they are on the quality track. The evaluation also serves as a means for identifying additional training requirements. It is never used in a negative fashion (e.g. as an input to determining the best division). Jack Doxie, Head of the Hewlett-Packard TQM Center recommends that the Malcolm Baldridge Award criteria as an outstanding basis for developing an evaluation system. [Ref. 21]

2. Keeping the Record Straight

The TQM structure should have a means of recording and expanding the corporate knowledge. This translates into a TQM staffing requirement in addition to the TQM Coordinator. Larry Johnston documented that the actual TQM staff requirements are minimal. The goal of the staff is to maintain continuity. The TQM center should maintain a library of up-to-date literature in the area of TQM. The TQM center should also maintain a list of contacts at other activities. Updating the activity's in-house training course is another responsibility for the TQM center.

The TQM structure should provide a means of recording what has been done at the command. Worth recording are QMB and PAT charter's, membership, findings, recommendations and actions taken. With today's austere budgeting and numerous program reviews, the TQM center should always be prepared to answer the question of how much did the TQM training cost and what savings have been realized as a result.

IX. CONCLUSION

Total Quality Management in the military is no longer an academic curiosity or exercise. It can and has been taken from theory and implemented in operational fleet units. The methods and resources are available to Intermediate Maintenance Activities wishing to implement Total Quality Management.

A. THESIS QUESTIONS ANSWERED

1. Primary Research Question

Can Total Quality Management be implemented at Intermediate Maintenance Activities? Yes. There are four major factors supporting this answer. First, the implementation of TQM is supported by the Chief of Naval Operations and NAVAIR. Second, the intermediate maintenance organizational environment lends itself to the implementation of TQM by virtue of its readily available measures of effectiveness. Third, TQM has already been successfully implemented at the depot level of maintenance. And finally, several components of the TQM philosophy already exist within the Navy.

2. Subsidiary Questions

Where are the Total Quality Management resource centers that Intermediate Maintenance Activities can turn to

for help? Intermediate Maintenance Activities can receive
help primarily from the Navy Personnel Research and
Development Center, the Naval Aviation Maintenance Office,
and the Naval Aviation Depots. Secondary sources are other
military commands and the private sector.

How do these resource centers approach the
implementation process? The Navy Personnel Research and
Development Center holds a seminar that teaches what steps
or milestones need to be reached in order to complete the
implementation process. NPRDC's seminar focuses on the
strategic, long term issues of implementing TQM. The Naval
Aviation Maintenance Office hold an on-site workshop that
provides training and a complete demonstration of the TQM
process.

What can be done to help facilitate the
implementation process? Intermediate Maintenance Activities
should use both NPRDC's seminar and NAMO's workshop in a
complimentary fashion. Both of these resource centers have
a great deal of knowledge and insight to pass on to the
fleet users. To help make the most of these resource
centers, the IMA should target and train the ESC members
along with other key personnel early in the implementation
process. A pilot program should be used to test the TQM
structure and obtain early feedback regarding the command's
acceptance of TQM, before it is given widespread exposure.

What are some of the obstacles to the implementation process? One of the major obstacles to the implementation process at the IMA are the already existing programs. The IMA must decide whether to incorporate existing programs in their entirety, or to start over. Another obstacle to overcome is the adaptation and transition of the reward system from an individual focus to one that promotes teamwork and the TQM philosophy. Finally, the IMA must institute a system of built-in supports for the TQM structure in the form of self guidance and documentation. The ultimate goal of these supports is to maintain and expand the corporate knowledge of Total Quality Management.

B. AREAS FOR FUTURE STUDY

Two obvious areas for future research present themselves. The first is the implementation of TQM at the organizational or squadron level. The challenge is that the output of a squadron, defense readiness, is a service and a public good. The second is to conduct a follow-up study at the intermediate level. At the time of this thesis, NAS Lemoore was joined by NAS Whidbey Island, NAS Miramar, and the USS Eisenhower as IMAs implementing TQM.

Another topic that presented itself during the course of this study is that the aviation community has NAMO to serve as a focal point for their TQM efforts. Does the Navy have a NAMO equivalent for the supply, medical, surface warfare,

and submarine communities? If not, is the Navy planning to correct this shortfall by creating special teams trained by NPRDC to teach TQM to selected units? [Ref. 22]

APPENDIX: ADM KELSO'S "NAVALIZED" FOURTEEN POINTS

1. Understand the mission and principles of the Navy. Have a clear grasp of how your command supports the Navy's mission and how the principles apply to your day-to-day actions.

    We are developing the words to send you for the Navy's mission and principles. From these you can develop the mission for your organization.

2. Quality is the essence of TQL. Insist on quality performance and material. Do the job correctly the first time.

3. Know your job. Analyze and understand every facet of your responsibilities and those of your people.

4. Words alone don't solve problems. Look first at the process and the system for faults and solutions, not the people. Improve the process, train the people.

5. Quality training is the key to success. People must be fully trained to do their jobs. You are never too senior to learn.

    To do your best is not good enough unless you are properly trained to do the job.

6. Use analytical methods to understand and improve your jobs. Graphs and charts, properly used, are invaluable tools in this effort.

7. We are a team. We must work together across departments and commands.

    We must listen to the most junior people. All are charged with making the work place and quality of life better. All suggestions for improvement must be explained and action taken or rejected by the leadership.

    The leader must provide those who suggest improvements and ideas with feedback as to what is being done with the suggestion. The leadership will not necessarily adopt all ideas but the leadership must provide the feedback on every suggestion.

8. Create an atmosphere of trust and open communication where everyone shares a sense of pride in their work.

   Get fear out of the work place. Create an atmosphere in which people tell you what is wrong in order that it can be fixed.

   Unless we recognize the problems we cannot improve.

   We need to reward people who have the courage to tell us what they see that needs improvement so we can get better.

   Good ideas and lessons learned must be transmitted and shared between departments and commands.

9. Inspect smarter. Inspections should be methods of learning and improvement rather than threatening events.

   As all learn to do the job correctly the first and every time, the number of inspections will decrease.

10. Demand quality, not quotas.

    Quality in the work place and in our lives is what we strive for.

    If we get quality, all the other goals and quotas will follow.

11. Education and self- improvement are just as important as training. We must always get better.

    Everyone must be involved in training and self education.

12. All improvements, big and small alike, are important.

13. Be a leader. Your job as a supervisor is to guide and assist your people.

    The leader gets his people the tools and training they need to do their jobs correctly.

    It is the leader's responsibility to insure his people are properly trained for the job before they are placed in a position of standing a watch, starting a pump, lighting off a radar, firing a gun, loading a missile, etc.

14. All hands, from seaman to admiral, must learn and use TQL.

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